

peak), 1000 Hz superimposed sine wave. The output current was fed into the lock-in amplifier and the 1000 Hz signal was recorded (ACV technique). The data for each set of pads was compiled and averaged.

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	I_p	Relative Intensity I_p
DNA 1 (SEQ ID NO: 1) (Positive 2 Fc)	34 nA	0.11
DNA 2 (SEQ ID NO: 2) (Positive Sandwich Assay)	218 nA	0.7
DNA 3 (SEQ ID NO: 3) (Negative)	0.3 nA	0.001
DNA 4 (SEQ ID NO: 2) (Positive Sandwich Assay)	317 nA	1

On page 128, immediately preceding the claims, please insert the enclosed text entitled "SEQUENCE LISTING".

In the Claims:

✓
Please cancel claims 1-10.

✓
Please add the following new claims:

--11. A method of detecting target analytes in a sample comprising:

a) providing an array comprising a plurality of electrodes, at least one of which comprises an assay complex comprising:

- Sub
B1
- i) a capture binding ligand covalently attached to said electrode;
 - ii) a target analyte; and
 - iii) an electron transfer moiety;

b) applying an electronic first input signal to said assay complex;

c) receiving an electronic output signal;

d) processing said output signal to detect the presence of said target analytes.

12. A method of detecting target analytes in a sample comprising:

a) providing an array comprising a plurality of electrodes, at least one of which comprises an assay complex comprising:

- A4
- i) a capture binding ligand covalently attached to said electrode;
 - ii) a target analyte; and

- Sub B1
- iii) an electron transfer moiety;
 - b) applying an electronic first input signal to said assay complex;
 - c) receiving an electronic output signal;
 - d) processing said output signal to increase the signal-to-noise ratio and detect the presence of said target analyte.

13. A method of detecting target nucleic acid sequences in a sample comprising:
- a) providing an array comprising a plurality of electrodes, at least one of which comprises an assay complex comprising:
 - i) a capture probe covalently attached to said electrode;
 - ii) a target sequence; and
 - iii) an electron transfer moiety;
 - b) applying an electronic first input signal to said assay complex;
 - c) receiving an electronic output signal;
 - d) processing said output signal to detect the presence of said target sequences.

14. A method according to claim 1 or 2 wherein said target analyte is a nucleic acid.

15. A method according to claim 1 or 2 wherein said target analyte is a protein.

16. A method according to claim 11, 12 or 13 wherein said processing comprises analysis of higher harmonic signals.

17. A method according to claim 11, 12 or 13 wherein said processing comprises a fast Fourier transform (FFT) analysis.

18. A method according to claim 11, 12 or 13 wherein said processing comprises joint-time frequency transformation (JTFT) analysis.

Sub (13) 19. A method according to claim 11, 12 or 13 wherein said processing comprises the use of a peak recognition scheme.

Sub C3 20. A method according to claim 11, 12 or 13 wherein said processing comprises a digital filter.

21. A method according to claim 11, 12 or 13 wherein said processing comprises signal averaging.

22. A method according to claim 11, 12 or 13 wherein said processing comprises spectral analysis.

23. A method according to claim 11, 12 or 13 wherein said processing comprises peak recognition.

24. A method according to claim 11, 12 or 13 wherein said input signal comprises an alternating current (AC) component.

Sub B2 25. A method according to claim 11, 12 or 13 wherein said input signal comprises an AC component and a DC component.

26. A method according to claim 11, 12 or 13 further comprising applying a plurality of input signals.

Sub B3 27. A method of detecting target analytes in a sample comprising:

a) providing an array comprising a plurality of electrodes, at least one of which comprises an assay complex comprising:

- i) a capture binding ligand covalently attached to said electrode;
- ii) a target analyte; and
- iii) an electron transfer moiety;

b) applying a first input signal to said assay complex, wherein said input signal comprises the sum of multiple frequencies at a plurality of amplitudes;

c) receiving an output signal;

d) processing said output signal to detect the presence of said target analytes.--